Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Investigation Services
Attention	Mitch Delaney

Sample Login Details	
Your Reference	E29816KD, North Curl Curl
Envirolab Reference	**155059**
Date Sample Received	11/10/2016
Date Instructions Received	11/10/2016
Date Results Expected to be Reported	**18/10/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	13 Soils
Turnaround Time Requested	Standard
Temperature on receipt (°C)	13.2
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

Envirolab Services Pty Ltd
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12 Ashley St Chatswood NSW 2067
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Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*Organochlorine Pesticides in soil*	*Organophosphorus Pesticides*	*PCBs in Soil*	*Acid Extractable metals in soil*	*Asbestos ID - soils*	*On Hold*
BH1-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH1-0.5-0.95									✓
BH2-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH2-0.5-0.95	✓	✓	✓	✓	✓	✓	✓		
BH3-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH3-0.5-0.95									✓
BH4-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH4-0.5-0.95									✓
BH5-0.2-0.3	✓	✓	✓	✓	✓	✓	✓	✓	
BH5-0.5-0.95									✓
BH6-0.1-0.2	✓	✓	✓	✓	✓	✓	✓	✓	
BH6-0.5-0.95	✓	✓	✓	✓	✓	✓	✓		
DUPA	✓	✓	✓	✓	✓	✓	✓		

COC received 11/10 9:20am

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: ~~E29816K0~~ E29816KD Date Results Required: STANDARD Page: 1 of 1	ENVIRONMENTAL INVESTIGATION SERVICES REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Mitch Delaney

Location: North Curl Curl

Sampler: AF

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos			
4/10/16	1	BH1	0.1-0.2	G, A	0	Silty Sand				X								
	2	BH1	0.5-0.95	|	0	Sand												
	3	BH2	0.1-0.2	|	0	Silty Sand				X								
	4	BH2	0.5-0.95	|	0	Sand			X									
	5	BH3	0.1-0.2	|	0	Silty Sand				X								
	6	BH3	0.5-0.95	|	0	Sand												
	7	BH4	0.1-0.2	|	0	Silty Sand				X								
	8	BH4	0.5-0.95	|	0	Sand												
	9	BH5	0.2-0.3	|	0	Silty Sand				X								
	10	BH5	0.5-0.95	|	0	Sand												
	11	BH6	0.1-0.2	|	4-5	Silty Sand				X								
	12	BH6	0.5-0.95	|	0	Sand			X									
	13	DUP A	-	G		Soil			X									

ENVIROLAB

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 155059

Date Received: 11.10.16

Time Received: 13.00

Received by: JE

Temp: Cool/Ambient 13.2°C

Cooling: Ice/Icepack

Security: Intact/Broken/None

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
MD	6/10/16		ELS JE	11.10.16 13.00

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
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Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 155059-A

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Mitch Delaney

Sample log in details:

Your Reference:	**E29816KD, North Curl Curl**
No. of samples:	Additional Testing on 4 Soils
Date samples received / completed instructions received	11/10/16 / 18/10/16

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	25/10/16 / 24/10/16
Date of Preliminary Report:	Not Issued

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Results Approved By:

David Springer
General Manager

Metals in TCLP USEPA1311					
Our Reference:	UNITS	155059-A-5	155059-A-7	155059-A-9	155059-A-11
Your Reference	---------- -	BH3	BH4	BH5	BH6
Depth	----------	0.1-0.2	0.1-0.2	0.2-0.3	0.1-0.2
Date Sampled		4/10/2016	4/10/2016	4/10/2016	4/10/2016
Type of sample		Soil	Soil	Soil	Soil
Date extracted	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016
Date analysed	-	20/10/2016	20/10/2016	20/10/2016	20/10/2016
pH of soil for fluid# determ.	pH units	7.6	5.5	6.1	5.8
pH of soil TCLP (after HCl)	pH units	1.7	1.7	1.7	1.7
Extraction fluid used	-	1	1	1	1
pH of final Leachate	pH units	5.0	5.0	5.0	5.0
Lead in TCLP	mg/L	0.09	0.1	0.74	0.07

Method ID	Methodology Summary
Inorg-004	Toxicity Characteristic Leaching Procedure (TCLP) using in house method INORG-004.
EXTRACT.7	Toxicity Characteristic Leaching Procedure (TCLP).
Inorg-001	pH - Measured using pH meter and electrode in accordance with APHA latest edition, 4500-H+. Please note that the results for water analyses are indicative only, as analysis outside of the APHA storage times.
Metals-020 ICP-AES	Determination of various metals by ICP-AES.

QUALITY CONTROL Metals in TCLP USEPA1311	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			20/10/2016	[NT]	[NT]	LCS-W1	20/10/2016
Date analysed	-			20/10/2016	[NT]	[NT]	LCS-W1	20/10/2016
Lead in TCLP	mg/L	0.03	Metals-020 ICP-AES	<0.03	[NT]	[NT]	LCS-W1	99%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Aileen Hie

From: Mitchell Delaney <MDelaney@jkgroup.net.au>
Sent: Tuesday, 18 October 2016 12:11 PM
To: Aileen Hie
Subject: Additional TCLP analysis request 155059 - EIS ref E29816KD

Hi Aileen,

Can I please schedule additional TCLP analysis for ***lead*** for the following samples:

5 • BH3 (0.1-0.2m);
7 • BH4 (0.1-0.2m);
9 • BH5 (0.2-0.3m); and
11 • BH6 (0.1-0.2m).

Many thanks.

Envirolab Ref: 155059A
Due: 25/10/16
Std + 1A

Regards,

Mitchell Delaney
Senior Environmental Scientist
MDelaney@jkgroup.net.au
www.jkgroup.net.au

Environmental Investigation Services
CONSULTING ENVIRONMENTAL ENGINEERS AND SCIENTISTS
PO Box 976, North Ryde BC NSW 1670
115 Wicks Rd, Macquarie Park NSW 2113
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12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 154756

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Mitch Delaney

Sample log in details:

Your Reference:	**E29816KD, North Curl Curl**
No. of samples:	4 materials
Date samples received:	06/10/2016
Date completed instructions received:	06/10/2016

Analysis Details:

Please refer to the following pages for results and methodology summary.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Note, even after disintegration it can be difficult to detect the presence of asbestos in some asbestos containing bulk materials using PLM and dispersion staining. This is due to the low grade or small length or diameter of the asbestos fibres present in the material, or to the fact that very fine fibres have been distributed intimately throughout the materials. Vinyl/asbestos floor tiles, some asbestos containing epoxy resins and some ore samples are examples of these types of material, which are difficult to analyse.

Report Details:

Date results requested by:	7/10/16
Date of Preliminary Report:	Not Issued
Issue Date:	7/10/16

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Results Approved By:

Asbestos was analysed by Approved Identifier:	Matt Mansfield
Asbestos was authorised by Approved Signatory:	Matt Mansfield

M. Mansfield
Matt Mansfield
Approved Signatory

ACCREDITED FOR TECHNICAL COMPETENCE

Envirolab Ref: –	Sample ID: –	Date analysed -	Mass / Dimension of Sample -	Sample Description -	Asbestos ID in materials -
154756-1	MDF1	7/10/2016	30x20x3mm	Beige compressed fibre cement material	Chrysotile asbestos detected Amosite asbestos detected Crocidolite asbestos detected
154756-2	MDF2	7/10/2016	40x18x3mm	Beige compressed fibre cement material	Chrysotile asbestos detected Amosite asbestos detected
154756-3	MDF3	7/10/2016	70x55x3mm	Brown layered fibrous sheet	Chrysotile asbestos detected
154756-4	MDF4	7/10/2016	60x30x3mm	Brown layered fibrous sheet	Chrysotile asbestos detected

Method ID	Methodology Summary
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Investigation Services
Attention	Mitch Delaney

Sample Login Details	
Your Reference	E29816KD, North Curl Curl
Envirolab Reference	**154756**
Date Sample Received	06/10/2016
Date Instructions Received	06/10/2016
Date Results Expected to be Reported	**07/10/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	4 materials
Turnaround Time Requested	24hr
Temperature on receipt (°C)	NA
Cooling Method	Not applicable
Sampling Date Provided	

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

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ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

Sample Id	*Asbestos ID - materials*
MDF1	✓
MDF2	✓
MDF3	✓
MDF4	✓

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD 12 ASHLEY STREET CHATSWOOD NSW 2067 P: (02) 99106200 F: (02) 99106201 Attention: Aileen	EIS Job Number: E29816KD Date Results Required: 24 H TA Page: 1 of 1	ENVIRONMENTAL INVESTIGATION SERVICES REAR OF 115 WICKS ROAD MACQUARIE PARK, NSW 2113 P: 02-9888 5000 F: 02-9888 5001 Attention: Mitch Delaney

Location:	North Curl Curl						Sample Preserved in Esky on Ice										
Sampler:	MD						Tests Required										
Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 2	Combo 3a	Combo 6	Combo 6a	8 Metals	PAHs	TRH/BTEX	BTEX	Asbestos		
4/10/2016	1	MDF1	na	A	na	Material									X		
↓	2	MDF2	↓	↓	↓	↓									X		
	3	MDF3													X		
↓	4	MDF4	↓	↓	↓	↓									X		

ENVIROLAB

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 154756
Date Received: 6/10
Time Received: 1630
Received by: EH
Temp: Cool/Ambient
Cooling: Ice/Icepack
Security: Intact/Broken/None

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
MD.	6/10/16		ELS	6/10

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 159066

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Geoff Fletcher

Sample log in details:

Your Reference:	**E29816KD, North Curl Curl**
No. of samples:	24 Soils, 13 Materials
Date samples received / completed instructions received	13/12/16 / 13/12/16

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	20/12/16 / 19/12/16
Date of Preliminary Report:	Not Issued

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Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	159066-1	159066-4	159066-7	159066-10	159066-13
Your Reference	---------- -	BH7	BH8	BH9	BH10	BH11
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/12/2016	14/12/2016	14/12/2016	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016	15/12/2016	15/12/2016	15/12/2016
TRHC6 - C9	mg/kg	<25	<25	<25	<25	<25
TRHC6 - C10	mg/kg	<25	<25	<25	<25	<25
vTPHC6 - C10 less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	92	97	95	96	94

vTRH(C6-C10)/BTEXN in Soil			
Our Reference:	UNITS	159066-16	159066-19
Your Reference	---------- -	BH12	BH13
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016
Type of sample		Soil	Soil
Date extracted	-	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016
TRHC6 - C9	mg/kg	<25	<25
TRHC6 - C10	mg/kg	<25	<25
vTPHC6 - C10 less BTEX (F1)	mg/kg	<25	<25
Benzene	mg/kg	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1
m+p-xylene	mg/kg	<2	<2
o-Xylene	mg/kg	<1	<1
Total +ve Xylenes	mg/kg	<1	<1
naphthalene	mg/kg	<1	<1
Surrogate aaa-Trifluorotoluene	%	98	97

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	159066-1	159066-4	159066-7	159066-10	159066-13
Your Reference	---------- -	BH7	BH8	BH9	BH10	BH11
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/12/2016	14/12/2016	14/12/2016	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016	15/12/2016	15/12/2016	15/12/2016
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	300	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	220	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	220	<50	<50	<50	<50
Surrogate o-Terphenyl	%	90	82	83	86	86

svTRH (C10-C40) in Soil			
Our Reference:	UNITS	159066-16	159066-19
Your Reference	---------- -	BH12	BH13
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016
Type of sample		Soil	Soil
Date extracted	-	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50
Surrogate o-Terphenyl	%	86	85

PAHs in Soil Our Reference: Your Reference	UNITS ----------	159066-1 BH7	159066-4 BH8	159066-7 BH9	159066-10 BH10	159066-13 BH11
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/12/2016	14/12/2016	14/12/2016	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016	15/12/2016	15/12/2016	15/12/2016
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	93	95	97	94	94

PAHs in Soil			
Our Reference:	UNITS	159066-16	159066-19
Your Reference	----------	BH12	BH13
	-		
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016
Type of sample		Soil	Soil
Date extracted	-	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016
Naphthalene	mg/kg	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1
Phenanthrene	mg/kg	0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1
Fluoranthene	mg/kg	0.2	<0.1
Pyrene	mg/kg	0.2	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1
Chrysene	mg/kg	0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2
Benzo(a)pyrene	mg/kg	0.07	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5
Total +ve PAH's	mg/kg	0.74	<0.05
Surrogate p-Terphenyl-d14	%	94	94

Organochlorine Pesticides in soil						
Our Reference:	UNITS	159066-1	159066-4	159066-7	159066-10	159066-13
Your Reference	----------	BH7	BH8	BH9	BH10	BH11
Depth	- ----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/12/2016	14/12/2016	14/12/2016	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016	15/12/2016	15/12/2016	15/12/2016
HCB	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	104	105	104	101

Organochlorine Pesticides in soil			
Our Reference:	UNITS	159066-16	159066-19
Your Reference	----------	BH12	BH13
	-		
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016
Type of sample		Soil	Soil
Date extracted	-	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016
HCB	mg/kg	<0.1	<0.1
alpha-BHC	mg/kg	<0.1	<0.1
gamma-BHC	mg/kg	<0.1	<0.1
beta-BHC	mg/kg	<0.1	<0.1
Heptachlor	mg/kg	<0.1	<0.1
delta-BHC	mg/kg	<0.1	<0.1
Aldrin	mg/kg	<0.1	<0.1
Heptachlor Epoxide	mg/kg	<0.1	<0.1
gamma-Chlordane	mg/kg	<0.1	<0.1
alpha-chlordane	mg/kg	<0.1	<0.1
Endosulfan I	mg/kg	<0.1	<0.1
pp-DDE	mg/kg	<0.1	<0.1
Dieldrin	mg/kg	<0.1	<0.1
Endrin	mg/kg	<0.1	<0.1
pp-DDD	mg/kg	<0.1	<0.1
Endosulfan II	mg/kg	<0.1	<0.1
pp-DDT	mg/kg	<0.1	<0.1
Endrin Aldehyde	mg/kg	<0.1	<0.1
Endosulfan Sulphate	mg/kg	<0.1	<0.1
Methoxychlor	mg/kg	<0.1	<0.1
Total +ve DDT+DDD+DDE	mg/kg	<0.1	<0.1
Surrogate TCMX	%	105	105

Organophosphorus Pesticides						
Our Reference:	UNITS	159066-1	159066-4	159066-7	159066-10	159066-13
Your Reference	----------	BH7	BH8	BH9	BH10	BH11
	-					
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/12/2016	14/12/2016	14/12/2016	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016	15/12/2016	15/12/2016	15/12/2016
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCMX	%	103	104	105	104	101

Organophosphorus Pesticides			
Our Reference:	UNITS	159066-16	159066-19
Your Reference	----------	BH12	BH13
	-		
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016
Type of sample		Soil	Soil
Date extracted	-	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016
Azinphos-methyl (Guthion)	mg/kg	<0.1	<0.1
Bromophos-ethyl	mg/kg	<0.1	<0.1
Chlorpyriphos	mg/kg	<0.1	<0.1
Chlorpyriphos-methyl	mg/kg	<0.1	<0.1
Diazinon	mg/kg	<0.1	<0.1
Dichlorvos	mg/kg	<0.1	<0.1
Dimethoate	mg/kg	<0.1	<0.1
Ethion	mg/kg	<0.1	<0.1
Fenitrothion	mg/kg	<0.1	<0.1
Malathion	mg/kg	<0.1	<0.1
Parathion	mg/kg	<0.1	<0.1
Ronnel	mg/kg	<0.1	<0.1
Surrogate TCMX	%	105	105

PCBs in Soil						
Our Reference:	UNITS	159066-1	159066-4	159066-7	159066-10	159066-13
Your Reference	----------	BH7	BH8	BH9	BH10	BH11
	-					
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	14/12/2016	14/12/2016	14/12/2016	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016	15/12/2016	15/12/2016	15/12/2016
Aroclor 1016	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Surrogate TCLMX	%	103	104	105	104	101

PCBs in Soil			
Our Reference:	UNITS	159066-16	159066-19
Your Reference	----------	BH12	BH13
	-		
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016
Type of sample		Soil	Soil
Date extracted	-	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016
Aroclor 1016	mg/kg	<0.1	<0.1
Aroclor 1221	mg/kg	<0.1	<0.1
Aroclor 1232	mg/kg	<0.1	<0.1
Aroclor 1242	mg/kg	<0.1	<0.1
Aroclor 1248	mg/kg	<0.1	<0.1
Aroclor 1254	mg/kg	<0.1	<0.1
Aroclor 1260	mg/kg	<0.1	<0.1
Total +ve PCBs (1016-1260)	mg/kg	<0.1	<0.1
Surrogate TCLMX	%	105	105

Acid Extractable metals in soil						
Our Reference:	UNITS	159066-1	159066-4	159066-7	159066-10	159066-13
Your Reference	----------	BH7	BH8	BH9	BH10	BH11
	-					
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/12/2016	14/12/2016	14/12/2016	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016	15/12/2016	15/12/2016	15/12/2016
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	3	<1	1	5	5
Copper	mg/kg	8	1	5	6	6
Lead	mg/kg	34	15	15	12	15
Mercury	mg/kg	0.2	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	1	<1	<1	3	3
Zinc	mg/kg	90	6	16	46	19

Acid Extractable metals in soil			
Our Reference:	UNITS	159066-16	159066-19
Your Reference	----------	BH12	BH13
	-		
Depth	----------	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016
Type of sample		Soil	Soil
Date prepared	-	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016
Arsenic	mg/kg	<4	<4
Cadmium	mg/kg	<0.4	<0.4
Chromium	mg/kg	2	4
Copper	mg/kg	4	4
Lead	mg/kg	16	13
Mercury	mg/kg	<0.1	<0.1
Nickel	mg/kg	1	1
Zinc	mg/kg	19	49

Moisture Our Reference: Your Reference	UNITS ----------	159066-1 BH7	159066-4 BH8	159066-7 BH9	159066-10 BH10	159066-13 BH11
Depth	-	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled	----------	11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	14/12/2016	14/12/2016	14/12/2016	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016	15/12/2016	15/12/2016	15/12/2016
Moisture	%	6.7	5.1	6.0	5.1	15

Moisture Our Reference: Your Reference	UNITS ----------	159066-16 BH12	159066-19 BH13
Depth	-	0.0-0.1	0.0-0.1
Date Sampled	----------	11/12/2016	11/12/2016
Type of sample		Soil	Soil
Date prepared	-	14/12/2016	14/12/2016
Date analysed	-	15/12/2016	15/12/2016
Moisture	%	4.6	4.5

Asbestos ID - soils						
Our Reference:	UNITS	159066-1	159066-4	159066-7	159066-10	159066-13
Your Reference	---------- -	BH7	BH8	BH9	BH10	BH11
Depth	----------	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1	0.0-0.1
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Sample mass tested	g	Approx 25g	Approx 35g	Approx 40g	Approx 60g	Approx 30g
Sample Description	-	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Asbestos ID - soils						
Our Reference:	UNITS	159066-16	159066-19	159066-22	159066-23	159066-24
Your Reference	---------- -	BH12	BH13	SS1	SS2	SS3
Depth	----------	0.0-0.1	0.0-0.1	Surface 0.0-0.05	Surface 0.0-0.05	Surface 0.0-0.05
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date analysed	-	19/12/2016	19/12/2016	19/12/2016	19/12/2016	19/12/2016
Sample mass tested	g	Approx 35g	Approx 45g	Approx 50g	Approx 55g	Approx 40g
Sample Description	-	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil	Brown sandy soil
Asbestos ID in soil	-	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected	No asbestos detected at reporting limit of 0.1g/kg Organic fibres detected
Trace Analysis	-	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected	No asbestos detected

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-005	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's. Note, the Total +ve reported DDD+DDE+DDT PQL is reflective of the lowest individual PQL and is therefore simply a sum of the positive individually report DDD+DDE+DDT.
Org-008	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC with dual ECD's.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD.
Org-006	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD. Note, the Total +ve PCBs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PCBs" is simply a sum of the positive individual PCBs.

Method ID	Methodology Summary
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.
ASB-001	Asbestos ID - Qualitative identification of asbestos in bulk samples using Polarised Light Microscopy and Dispersion Staining Techniques including Synthetic Mineral Fibre and Organic Fibre as per Australian Standard 4964-2004.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/12/2016	159066-1	14/12/2016 || 14/12/2016	LCS-10	14/12/2016
Date analysed	-			15/12/2016	159066-1	15/12/2016 || 15/12/2016	LCS-10	15/12/2016
TRHC$_6$ - C$_9$	mg/kg	25	Org-016	<25	159066-1	<25 || <25	LCS-10	95%
TRHC$_6$ - C$_{10}$	mg/kg	25	Org-016	<25	159066-1	<25 || <25	LCS-10	95%
Benzene	mg/kg	0.2	Org-016	<0.2	159066-1	<0.2 || <0.2	LCS-10	94%
Toluene	mg/kg	0.5	Org-016	<0.5	159066-1	<0.5 || <0.5	LCS-10	97%
Ethylbenzene	mg/kg	1	Org-016	<1	159066-1	<1 || <1	LCS-10	95%
m+p-xylene	mg/kg	2	Org-016	<2	159066-1	<2 || <2	LCS-10	95%
o-Xylene	mg/kg	1	Org-016	<1	159066-1	<1 || <1	LCS-10	99%
naphthalene	mg/kg	1	Org-014	<1	159066-1	<1 || <1	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	97	159066-1	92 || 95 || RPD: 3	LCS-10	100%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/12/2016	159066-1	14/12/2016 || 14/12/2016	LCS-10	14/12/2016
Date analysed	-			15/12/2016	159066-1	15/12/2016 || 15/12/2016	LCS-10	15/12/2016
TRHC$_{10}$ - C$_{14}$	mg/kg	50	Org-003	<50	159066-1	<50 || <50	LCS-10	98%
TRHC$_{15}$ - C$_{28}$	mg/kg	100	Org-003	<100	159066-1	<100 || <100	LCS-10	100%
TRHC$_{29}$ - C$_{36}$	mg/kg	100	Org-003	<100	159066-1	300 || 250 || RPD: 18	LCS-10	91%
TRH>C$_{10}$-C$_{16}$	mg/kg	50	Org-003	<50	159066-1	<50 || <50	LCS-10	98%
TRH>C$_{16}$-C$_{34}$	mg/kg	100	Org-003	<100	159066-1	220 || 200 || RPD: 10	LCS-10	100%
TRH>C$_{34}$-C$_{40}$	mg/kg	100	Org-003	<100	159066-1	<100 || <100	LCS-10	91%
Surrogate o-Terphenyl	%		Org-003	98	159066-1	90 || 95 || RPD: 5	LCS-10	96%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base || Duplicate || %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/12/2016	159066-1	14/12/2016 || 14/12/2016	LCS-10	14/12/2016
Date analysed	-			15/12/2016	159066-1	15/12/2016 || 15/12/2016	LCS-10	15/12/2016
Naphthalene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	LCS-10	109%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	LCS-10	106%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	LCS-10	102%
Anthracene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	LCS-10	100%
Pyrene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	LCS-10	103%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	159066-1	<0.2 || <0.2	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	159066-1	<0.05 || <0.05	LCS-10	111%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	106	159066-1	93 || 104 || RPD: 11	LCS-10	116%
QUALITY CONTROL Organochlorine Pesticides in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/12/2016	159066-1	14/12/2016 || 14/12/2016	LCS-10	14/12/2016
Date analysed	-			15/12/2016	159066-1	15/12/2016 || 15/12/2016	LCS-10	15/12/2016
HCB	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
alpha-BHC	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	LCS-10	97%
gamma-BHC	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
beta-BHC	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Heptachlor	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	LCS-10	100%
delta-BHC	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Aldrin	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	LCS-10	103%
Heptachlor Epoxide	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	LCS-10	108%
gamma-Chlordane	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
alpha-chlordane	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan I	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
pp-DDE	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	LCS-10	105%
Dieldrin	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	LCS-10	116%
Endrin	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	LCS-10	110%
pp-DDD	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	LCS-10	118%
Endosulfan II	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
pp-DDT	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Endrin Aldehyde	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Endosulfan Sulphate	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	LCS-10	74%
Methoxychlor	mg/kg	0.1	Org-005	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCMX	%		Org-005	115	159066-1	103 || 114 || RPD: 10	LCS-10	124%

QUALITY CONTROL Organophosphorus Pesticides	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/12/2016	159066-1	14/12/2016 || 14/12/2016	LCS-10	14/12/2016
Date analysed	-			15/12/2016	159066-1	15/12/2016 || 15/12/2016	LCS-10	15/12/2016
Azinphos-methyl (Guthion)	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Bromophos-ethyl	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Chlorpyriphos	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	LCS-10	102%
Chlorpyriphos-methyl	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Diazinon	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Dichlorvos	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	LCS-10	98%
Dimethoate	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Ethion	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	LCS-10	110%
Fenitrothion	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	LCS-10	119%
Malathion	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	LCS-10	73%
Parathion	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	LCS-10	117%
Ronnel	mg/kg	0.1	Org-008	<0.1	159066-1	<0.1 || <0.1	LCS-10	113%
Surrogate TCMX	%		Org-008	115	159066-1	103 || 114 || RPD: 10	LCS-10	104%

QUALITY CONTROL PCBs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			14/12/2016	159066-1	14/12/2016 || 14/12/2016	LCS-10	14/12/2016
Date analysed	-			15/12/2016	159066-1	15/12/2016 || 15/12/2016	LCS-10	15/12/2016
Aroclor 1016	mg/kg	0.1	Org-006	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1221	mg/kg	0.1	Org-006	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1232	mg/kg	0.1	Org-006	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1242	mg/kg	0.1	Org-006	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1248	mg/kg	0.1	Org-006	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Aroclor 1254	mg/kg	0.1	Org-006	<0.1	159066-1	<0.1 || <0.1	LCS-10	111%
Aroclor 1260	mg/kg	0.1	Org-006	<0.1	159066-1	<0.1 || <0.1	[NR]	[NR]
Surrogate TCLMX	%		Org-006	115	159066-1	103 || 114 || RPD: 10	LCS-10	104%

QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			14/12/2016	159066-1	14/12/2016 || 14/12/2016	LCS-10	14/12/2016
Date analysed	-			15/12/2016	159066-1	15/12/2016 || 15/12/2016	LCS-10	15/12/2016
Arsenic	mg/kg	4	Metals-020	<4	159066-1	<4 || <4	LCS-10	109%
Cadmium	mg/kg	0.4	Metals-020	<0.4	159066-1	<0.4 || <0.4	LCS-10	102%
Chromium	mg/kg	1	Metals-020	<1	159066-1	3 || 2 || RPD: 40	LCS-10	108%
Copper	mg/kg	1	Metals-020	<1	159066-1	8 || 7 || RPD: 13	LCS-10	108%
Lead	mg/kg	1	Metals-020	<1	159066-1	34 || 37 || RPD: 8	LCS-10	102%
Mercury	mg/kg	0.1	Metals-021	<0.1	159066-1	0.2 || 0.2 || RPD: 0	LCS-10	100%
Nickel	mg/kg	1	Metals-020	<1	159066-1	1 || 1 || RPD: 0	LCS-10	99%
Zinc	mg/kg	1	Metals-020	<1	159066-1	90 || 88 || RPD: 2	LCS-10	102%

Report Comments:

Asbestos: Excessive sample volume was provided for asbestos analysis. A portion of the supplied sample was sub-sampled according to Envirolab procedures. We cannot guarantee that this sub-sample is indicative of the entire sample. Envirolab recommends supplying 40-50g (50mL) of sample in its own container as per AS4964-2004.

Note: Samples 159066-13, 22-24 were sub-sampled from bags provided by the client.

Asbestos ID was analysed by Approved Identifier:	Matt Tang
Asbestos ID was authorised by Approved Signatory:	Paul Ching

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.
Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.
Spikes for Physical and Aggregate Tests are not applicable.
For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.
Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
ph 02 9910 6200 fax 02 9910 6201
enquiries@envirolabservices.com.au
www.envirolabservices.com.au

SAMPLE RECEIPT ADVICE

Client Details	
Client	Environmental Investigation Services
Attention	Geoff Fletcher

Sample Login Details	
Your Reference	E29816KD, North Curl Curl
Envirolab Reference	**159066**
Date Sample Received	13/12/2016
Date Instructions Received	13/12/2016
Date Results Expected to be Reported	**20/12/2016**

Sample Condition	
Samples received in appropriate condition for analysis	YES
No. of Samples Provided	24 Soils, 13 Materials
Turnaround Time Requested	Standard
Temperature on receipt (°C)	15.0
Cooling Method	Ice Pack
Sampling Date Provided	YES

Comments
Samples will be held for 1 month for water samples and 2 months for soil samples from date of receipt of samples

Please direct any queries to:

Aileen Hie	Jacinta Hurst
Phone: 02 9910 6200	Phone: 02 9910 6200
Fax: 02 9910 6201	Fax: 02 9910 6201
Email: ahie@envirolabservices.com.au	Email: jhurst@envirolabservices.com.au

Sample and Testing Details on following page

Envirolab Services Pty Ltd
ABN 37 112 535 645
12 Ashley St Chatswood NSW 2067
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Sample Id	*vTRH(C6-C10)/BTEXN in Soil*	*svTRH (C10-C40) in Soil*	*PAHs in Soil*	*Organochlorine Pesticides in soil*	*Organophosphorus Pesticides*	*PCBs in Soil*	*Acid Extractable metals in soil*	*Asbestos ID - soils*	*On Hold*
BH7-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH7-0.5-0.95									✓
BH7-1.6-1.95									✓
BH8-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH8-0.5-0.95									✓
BH8-1.5-1.95									✓
BH9-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH9-0.5-0.95									✓
BH9-1.5-1.95									✓
BH10-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH10-0.85-0.95									✓
BH10-1.7-1.95									✓
BH11-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH11-0.5-0.95									✓
BH11-1.7-1.95									✓
BH12-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH12-0.5-0.95									✓
BH12-1.7-1.95									✓
BH13-0.0-0.1	✓	✓	✓	✓	✓	✓	✓	✓	
BH13-0.5-0.95									✓
BH13-Surface 0.0-0.05									✓
SS1-Surface 0.0-0.05								✓	
SS2-Surface 0.0-0.05								✓	
SS3-Surface 0.0-0.05								✓	
HLF1-Surface									✓
HLF2-Surface									✓
HLF3-Surface									✓
HLF4-Surface									✓
HLF5-Surface									✓
HLF6-Surface									✓
HLF7-Surface									✓
HLF8-Surface									✓
HLF9-Surface									✓
HLF10-Surface									✓
HLF11-Surface									✓
Unlabelled									✓

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The '✓' indicates the testing you have requested. ***THIS IS NOT A REPORT OF THE RESULTS****.*

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E29816KD	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067	Date Results Required: STANDARD	MACQUARIE PARK, NSW 2113
P: (02) 99106200		P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201	Page: 1 of 2	Attention: Geoff Fletcher
Attention: Aileen		

Location: North Curl Curl

Sampler: HL + DAF

Sample Preserved in Esky on Ice

Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description	Combo 3	Combo 6a	Asbestos
11/12/16	1	BH 7	0-0.1	G, A	0			X	
	2	↓	0.5-0.95	G, A	0				
	3	↓	1.6-1.95	G	0				
	4	BH 8	0-0.1	G, A	0			X	
	5	↓	0.5-0.95	↓	0				
	6	↓	1.5-1.95	↓	0				
	7	BH 9	0-0.1	↓	0			X	
	8	↓	0.5-0.95	↓	0				
	9	↓	1.5-1.95	↓	0				
	10	BH 10	0-0.1	↓	0			X	
	11	↓	0.85-0.95	↓	0				
	12	↓	1.7-1.95	↓	1.1				
	13	BH 11	0-0.1	↓	0			X	
	14	↓	0.5-0.95	↓	0				
	15	↓	1.7-1.95	↓	0				
	16	BH 12	0-0.1	↓	0			X	
	17	↓	0.5-0.95	↓	0				
	18	↓	1.7-1.95	↓	0				
	19	BH 13	0-0.1	↓	0			X	
	20	↓	0.5-0.95	↓	0				
	21	↓	1.5-1.95	↓	0				
	22	SS1	Surface 0-0.05	A	—	Soil			X
	23	SS2	↓	↓	—	↓			X
	24	SS3	↓	↓	—	↓			X
↓	25	HLF 1	Surface	↓	—	Material			

ENVIROLAB

Envirolab Services
12 Ashley St
Chatswood NSW 2067
Ph: (02) 9910 6200

Job No: 159066

Date Received: 13.12.16

Time Received: 16.45

Received by: JE

Temp: Cool/Ambient 15.0°C

Cooling: Ice/Icepack

Security: Intact/Broken/None

Remarks (comments/detection limits required):

Sample Containers:
G - 250mg Glass Jar
A - Ziplock Asbestos Bag
P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
Geoff	13/12/16	14:20	JE ELS	13.12.16

159066

SAMPLE AND CHAIN OF CUSTODY FORM

TO:		FROM:
ENVIROLAB SERVICES PTY LTD	EIS Job Number: E29816KD	ENVIRONMENTAL INVESTIGATION SERVICES
12 ASHLEY STREET		REAR OF 115 WICKS ROAD
CHATSWOOD NSW 2067	Date Results Required: STANDARD	MACQUARIE PARK, NSW 2113
P: (02) 99106200		P: 02-9888 5000 F: 02-9888 5001
F: (02) 99106201	Page: 2 of 2	Attention: Geoff Fletcher
Attention: Aileen		

Location:	North Curl Curl	Sample Preserved in Esky on Ice
Sampler:	HL + DAF	Tests Required

Date Sampled	Lab Ref:	Sample Number	Depth (m)	Sample Container	PID	Sample Description			Combo 3	Combo 6a					Asbestos			
11/12/16	26	HLF2	surface	A	–	Material												
	27	HLF3			–													
	28	HLF4			–													
	29	HLF5			–													
	30	HLF6			–													
	31	HLF7			–													
	32	HLF8			–													
	33	HLF9			–													
	34	HLF10			–													
	35	HLF11			–													
Extra-SE	36	Unlabelled																

Remarks (comments/detection limits required):	Sample Containers: G - 250mg Glass Jar A - Ziplock Asbestos Bag P - Plastic Bag

Relinquished By:	Date:	Time:	Received By:	Date:
Geoff	13/12/16	14:20		

12 Ashley Street, Chatswood, NSW 2067
tel: +61 2 9910 6200

email: sydney@envirolab.com.au
envirolab.com.au

Envirolab Services Pty Ltd - Sydney | ABN 37 112 535 645

CERTIFICATE OF ANALYSIS 159066-A

Client:

Environmental Investigation Services
PO Box 976
North Ryde BC
NSW 1670

Attention: Geoff Fletcher

Sample log in details:

Your Reference:	**E29816KD, North Curl Curl**
No. of samples:	Additional Testing on 5 Soils
Date samples received / completed instructions received	13/12/16 / 21/12/16

Analysis Details:

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.
Please refer to the last page of this report for any comments relating to the results.

Report Details:

Date results requested by: / Issue Date:	5/01/17 / 28/12/16
Date of Preliminary Report:	Not Issued

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Accredited for compliance with ISO/IEC 17025 - Testing **Tests not covered by NATA are denoted with *.**

Results Approved By:

David Springer
General Manager

vTRH(C6-C10)/BTEXN in Soil						
Our Reference:	UNITS	159066-A-2	159066-A-5	159066-A-12	159066-A-14	159066-A-20
Your Reference	---------- -	BH7	BH8	BH10	BH11	BH13
Depth	----------	0.5-0.95	0.5-0.95	1.7-1.95	0.5-0.95	0.5-0.95
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/12/2016	22/12/2016	22/12/2016	22/12/2016	22/12/2016
Date analysed	-	23/12/2016	23/12/2016	23/12/2016	23/12/2016	23/12/2016
TRHC_6 - C_9	mg/kg	<25	<25	<25	<25	<25
TRHC_6 - C_{10}	mg/kg	<25	<25	<25	<25	<25
vTPHC_6 - C_{10} less BTEX (F1)	mg/kg	<25	<25	<25	<25	<25
Benzene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Toluene	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Ethylbenzene	mg/kg	<1	<1	<1	<1	<1
m+p-xylene	mg/kg	<2	<2	<2	<2	<2
o-Xylene	mg/kg	<1	<1	<1	<1	<1
Total +ve Xylenes	mg/kg	<1	<1	<1	<1	<1
naphthalene	mg/kg	<1	<1	<1	<1	<1
Surrogate aaa-Trifluorotoluene	%	84	84	85	88	84

svTRH (C10-C40) in Soil						
Our Reference:	UNITS	159066-A-2	159066-A-5	159066-A-12	159066-A-14	159066-A-20
Your Reference	---------- -	BH7	BH8	BH10	BH11	BH13
Depth	----------	0.5-0.95	0.5-0.95	1.7-1.95	0.5-0.95	0.5-0.95
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date extracted	-	22/12/2016	22/12/2016	22/12/2016	22/12/2016	22/12/2016
Date analysed	-	23/12/2016	23/12/2016	23/12/2016	23/12/2016	23/12/2016
TRHC$_{10}$ - C$_{14}$	mg/kg	<50	<50	<50	<50	<50
TRHC$_{15}$ - C$_{28}$	mg/kg	<100	<100	<100	<100	<100
TRHC$_{29}$ - C$_{36}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{10}$-C$_{16}$	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{10}$ - C$_{16}$ less Naphthalene (F2)	mg/kg	<50	<50	<50	<50	<50
TRH>C$_{16}$-C$_{34}$	mg/kg	<100	<100	<100	<100	<100
TRH>C$_{34}$-C$_{40}$	mg/kg	<100	<100	<100	<100	<100
Total +ve TRH (>C10-C40)	mg/kg	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%	76	73	74	73	75

PAHs in Soil Our Reference: Your Reference Depth Date Sampled Type of sample	UNITS ---------- - ---------- 	159066-A-2 BH7 0.5-0.95 11/12/2016 Soil	159066-A-5 BH8 0.5-0.95 11/12/2016 Soil	159066-A-12 BH10 1.7-1.95 11/12/2016 Soil	159066-A-14 BH11 0.5-0.95 11/12/2016 Soil	159066-A-20 BH13 0.5-0.95 11/12/2016 Soil
Date extracted	-	22/12/2016	22/12/2016	22/12/2016	22/12/2016	22/12/2016
Date analysed	-	23/12/2016	23/12/2016	23/12/2016	23/12/2016	23/12/2016
Naphthalene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Acenaphthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluorene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Phenanthrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Fluoranthene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Chrysene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(b,j+k)fluoranthene	mg/kg	<0.2	<0.2	<0.2	<0.2	<0.2
Benzo(a)pyrene	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Indeno(1,2,3-c,d)pyrene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Dibenzo(a,h)anthracene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(g,h,i)perylene	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Benzo(a)pyrene TEQ calc (zero)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(half)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Benzo(a)pyrene TEQ calc(PQL)	mg/kg	<0.5	<0.5	<0.5	<0.5	<0.5
Total +ve PAH's	mg/kg	<0.05	<0.05	<0.05	<0.05	<0.05
Surrogate p-Terphenyl-d14	%	79	84	82	81	84

Acid Extractable metals in soil						
Our Reference:	UNITS	159066-A-2	159066-A-5	159066-A-12	159066-A-14	159066-A-20
Your Reference	----------	BH7	BH8	BH10	BH11	BH13
	-					
Depth	----------	0.5-0.95	0.5-0.95	1.7-1.95	0.5-0.95	0.5-0.95
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/12/2016	22/12/2016	22/12/2016	22/12/2016	22/12/2016
Date analysed	-	22/12/2016	22/12/2016	22/12/2016	22/12/2016	22/12/2016
Arsenic	mg/kg	<4	<4	<4	<4	<4
Cadmium	mg/kg	<0.4	<0.4	<0.4	<0.4	<0.4
Chromium	mg/kg	6	21	8	2	<1
Copper	mg/kg	3	<1	<1	<1	<1
Lead	mg/kg	5	6	5	3	2
Mercury	mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1
Nickel	mg/kg	2	4	1	<1	<1
Zinc	mg/kg	63	2	2	<1	<1

Moisture Our Reference: Your Reference	UNITS ----------	159066-A-2 BH7	159066-A-5 BH8	159066-A-12 BH10	159066-A-14 BH11	159066-A-20 BH13
Depth	- ----------	0.5-0.95	0.5-0.95	1.7-1.95	0.5-0.95	0.5-0.95
Date Sampled		11/12/2016	11/12/2016	11/12/2016	11/12/2016	11/12/2016
Type of sample		Soil	Soil	Soil	Soil	Soil
Date prepared	-	22/12/2016	22/12/2016	22/12/2016	22/12/2016	22/12/2016
Date analysed	-	23/12/2016	23/12/2016	23/12/2016	23/12/2016	23/12/2016
Moisture	%	4.6	12	7.7	8.6	4.5

Method ID	Methodology Summary
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater.
Org-016	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS. Water samples are analysed directly by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.
Org-014	Soil samples are extracted with methanol and spiked into water prior to analysing by purge and trap GC-MS.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis.
Org-003	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
Org-012	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-MS. Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. For soil results:- 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, the Total +ve PAHs PQL is reflective of the lowest individual PQL and is therefore" Total +ve PAHs" is simply a sum of the positive individual PAHs.
Metals-020	Determination of various metals by ICP-AES.
Metals-021	Determination of Mercury by Cold Vapour AAS.
Inorg-008	Moisture content determined by heating at 105+/-5 deg C for a minimum of 12 hours.

QUALITY CONTROL vTRH(C6-C10)/BTEXN in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/12/2016	[NT]	[NT]	LCS-9	22/12/2016
Date analysed	-			23/12/2016	[NT]	[NT]	LCS-9	23/12/2016
TRH C_6 - C_9	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-9	89%
TRH C_6 - C_{10}	mg/kg	25	Org-016	<25	[NT]	[NT]	LCS-9	89%
Benzene	mg/kg	0.2	Org-016	<0.2	[NT]	[NT]	LCS-9	98%
Toluene	mg/kg	0.5	Org-016	<0.5	[NT]	[NT]	LCS-9	86%
Ethylbenzene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-9	85%
m+p-xylene	mg/kg	2	Org-016	<2	[NT]	[NT]	LCS-9	87%
o-Xylene	mg/kg	1	Org-016	<1	[NT]	[NT]	LCS-9	87%
naphthalene	mg/kg	1	Org-014	<1	[NT]	[NT]	[NR]	[NR]
Surrogate aaa-Trifluorotoluene	%		Org-016	87	[NT]	[NT]	LCS-9	82%

QUALITY CONTROL svTRH (C10-C40) in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/12/2016	[NT]	[NT]	LCS-9	22/12/2016
Date analysed	-			22/12/2016	[NT]	[NT]	LCS-9	22/12/2016
TRH C_{10} - C_{14}	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-9	111%
TRH C_{15} - C_{28}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-9	103%
TRH C_{29} - C_{36}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-9	106%
TRH >C_{10}-C_{16}	mg/kg	50	Org-003	<50	[NT]	[NT]	LCS-9	111%
TRH >C_{16}-C_{34}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-9	103%
TRH >C_{34}-C_{40}	mg/kg	100	Org-003	<100	[NT]	[NT]	LCS-9	106%
Surrogate o-Terphenyl	%		Org-003	86	[NT]	[NT]	LCS-9	98%

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date extracted	-			22/12/2016	[NT]	[NT]	LCS-9	22/12/2016
Date analysed	-			23/12/2016	[NT]	[NT]	LCS-9	23/12/2016
Naphthalene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-9	112%
Acenaphthylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Acenaphthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluorene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-9	111%
Phenanthrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-9	106%
Anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Fluoranthene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-9	101%
Pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	LCS-9	104%
Benzo(a)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Chrysene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(b,j+k) fluoranthene	mg/kg	0.2	Org-012	<0.2	[NT]	[NT]	[NR]	[NR]

QUALITY CONTROL PAHs in Soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Benzo(a)pyrene	mg/kg	0.05	Org-012	<0.05	[NT]	[NT]	LCS-9	111%
Indeno(1,2,3-c,d)pyrene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Dibenzo(a,h)anthracene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Benzo(g,h,i)perylene	mg/kg	0.1	Org-012	<0.1	[NT]	[NT]	[NR]	[NR]
Surrogate p-Terphenyl-d14	%		Org-012	87	[NT]	[NT]	LCS-9	106%
QUALITY CONTROL Acid Extractable metals in soil	UNITS	PQL	METHOD	Blank	Duplicate Sm#	Duplicate results Base II Duplicate II %RPD	Spike Sm#	Spike % Recovery
Date prepared	-			22/12/2016	[NT]	[NT]	LCS-9	22/12/2016
Date analysed	-			22/12/2016	[NT]	[NT]	LCS-9	22/12/2016
Arsenic	mg/kg	4	Metals-020	<4	[NT]	[NT]	LCS-9	121%
Cadmium	mg/kg	0.4	Metals-020	<0.4	[NT]	[NT]	LCS-9	108%
Chromium	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	113%
Copper	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	110%
Lead	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	107%
Mercury	mg/kg	0.1	Metals-021	<0.1	[NT]	[NT]	LCS-9	99%
Nickel	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	105%
Zinc	mg/kg	1	Metals-020	<1	[NT]	[NT]	LCS-9	105%

Report Comments:

Asbestos ID was analysed by Approved Identifier:	Not applicable for this job
Asbestos ID was authorised by Approved Signatory:	Not applicable for this job

INS: Insufficient sample for this test	PQL: Practical Quantitation Limit	NT: Not tested
NR: Test not required	RPD: Relative Percent Difference	NA: Test not required
<: Less than	>: Greater than	LCS: Laboratory Control Sample

Quality Control Definitions

Blank: This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, can be determined by processing solvents and reagents in exactly the same manner as for samples.

Duplicate: This is the complete duplicate analysis of a sample from the process batch. If possible, the sample selected should be one where the analyte concentration is easily measurable.

Matrix Spike : A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

LCS (Laboratory Control Sample) : This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Surrogate Spike: Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria.

Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction.

Spikes for Physical and Aggregate Tests are not applicable.

For VOCs in water samples, three vials are required for duplicate or spike analysis.

Duplicates: <5xPQL - any RPD is acceptable; >5xPQL - 0-50% RPD is acceptable.

Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was insufficient in order to satisfy laboratory QA/QC protocols.

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached.

Measurement Uncertainty estimates are available for most tests upon request.

Aileen Hie

From: Geoff Fletcher <GFletcher@jkgroup.net.au>
Sent: Wednesday, 21 December 2016 11:48 AM
To: Aileen Hie
Subject: RE: Results for Registration 159066 E29816KD, North Curl Curl

Hi Aileen

Could we please schedule the following additional analysis from the above lab report:

2 • BH7 (0.5-0.95m) Combo 3;
5 • BH8 (0.5-0.95m) Combo 3;
12 • BH10 (1.7-1.95m) Combo 3;
14 • BH11 (0.5-0.95m) Combo 3; and
20 • BH13 (0.5-0.95m) Combo 3

Envirolab Ref: 159066A
Due: 5/1/17
Std 7rA.

Regards,

Geoff Fletcher
Senior Environmental Scientist

T: +612 9888 5000
F: +612 9888 5001
GFletcher@jkgroup.net.au
www.jkgroup.net.au

EIS would like to take this opportunity to wish all our clients and suppliers a very Happy Christmas and thank you all for contributing to another great year for EIS.
Our office will be closed from 5pm on Friday 23rd December 2016 until 8am on Tuesday 3rd January 2017.

ENVIRONMENTAL INVESTIGATION SERVICES
CONSULTING ENVIRONMENTAL ENGINEERS AND SCIENTISTS
PO Box 976, North Ryde BC NSW 1670
115 Wicks Rd, Macquarie Park NSW 2113

From: Ken Nguyen [mailto:KNguyen@envirolab.com.au]
Sent: Monday, 19 December 2016 7:04 PM
To: Geoff Fletcher
Subject: Results for Registration 159066 E29816KD, North Curl Curl

Please refer to attached for:
a copy of the Certificate of Analysis
a copy of the COC
an excel file containing the results

Please note that a hard copy will not be posted.

Enquiries should be made directly to:
sydney@envirolab.com.au

Appendix D: Report Explanatory Notes

STANDARD SAMPLING PROCEDURE (SSP)

These protocols specify the basic procedures to be used when sampling soils or groundwater for environmental site assessments undertaken by EIS.

The purpose of these protocols is to provide standard methods for: sampling, decontamination procedures for sampling equipment, sample preservation, sample storage and sample handling. Deviations from these procedures must be recorded.

Soil Sampling

- Prepare a borehole/test pit log or made a note of the sample description for stockpiles.
- Layout sampling equipment on clean plastic sheeting to prevent direct contact with ground surface. The work area should be at a distance from the drill rig/excavator such that the machine can operate in a safe manner.
- Ensure all sampling equipment has been decontaminated prior to use.
- Remove any surface debris from the immediate area of the sampling location.
- Collect samples and place in glass jar with a Teflon seal. This should be undertaken as quickly as possible to prevent the loss of any volatiles. If possible, fill the glass jars completely.
- Collect samples for asbestos analysis and place in a zip-lock plastic bag.
- Label the sampling containers with the EIS job number, sample location (eg. BH1), sampling depth interval and date. If more than one sample container is used, this should also be indicated (eg. 2 = Sample jar 1 of 2 jars).
- Photoionisation detector (PID) screening of volatile organic compounds (VOCs) should be undertaken on samples using the soil sample headspace method. Headspace measurements are taken following equilibration of the headspace gasses in partly filled zip-lock plastic bags. PID headspace data is recorded on the borehole/test pit log and the chain of custody forms.
- Record the lithology of the sample and sample depth on the borehole/test pit log generally in accordance with AS1726-1993[20].
- Store the sample in a sample container cooled with ice or chill packs. On completion of the sampling the sample container should be delivered to the lab immediately or stored in the refrigerator prior to delivery to the lab. All samples are preserved in accordance with the standards outlined in the report.
- Check for the presence of groundwater after completion of each borehole using an electronic dip metre or water whistle. Boreholes should be left open until the end of fieldwork. All groundwater levels in the boreholes should be rechecked on the completion of the fieldwork.
- Backfill the boreholes/test pits with the excavation cuttings or clean sand prior to leaving the site.

Decontamination Procedures for Soil Sampling Equipment

- All sampling equipment should be decontaminated between every sampling location. This excludes single use PVC tubing used for push tubes etc. Equipment and materials required for the decontamination include:
  - Phosphate free detergent (Decon 90);
  - Potable water;
  - Stiff brushes; and
  - Plastic sheets.
- Ensure the decontamination materials are clean prior to proceeding with the decontamination.

[20] Standards Australia, (1993), *Geotechnical Site Investigations.* (AS1726-1993)

- Fill both buckets with clean potable water and add phosphate free detergent to one bucket.
- In the bucket containing the detergent, scrub the sampling equipment until all the material attached to the equipment has been removed.
- Rinse sampling equipment in the bucket containing potable water.
- Place cleaned equipment on clean plastic sheets.

If all materials are not removed by this procedure, high-pressure water cleaning is recommended. If any equipment is not completely decontaminated by both these processes, then the equipment should not be used until it has been thoroughly cleaned.

Groundwater Sampling

Groundwater samples are more sensitive to contamination than soil samples and therefore adhesion to this protocol is particularly important to obtain reliable, reproducible results. The recommendations detailed in AS/NZS 5667.1:1998 are considered to form a minimum standard.

The basis of this protocol is to maintain the security of the borehole and obtain accurate and representative groundwater samples. The following procedure should be used for collection of groundwater samples from previously installed groundwater monitoring wells.

- After monitoring well installation, at least three bore volumes should be pumped from the monitoring wells (well development) to remove any water introduced during the drilling process and/or the water that is disturbed during installation of the monitoring well. This should be completed prior to purging and sampling.
- Groundwater monitoring wells should then be left to recharge for at least three days before purging and sampling. Prior to purging or sampling, the condition of each well should observed and any anomalies recorded on the field data sheets. The following information should be noted: the condition of the well, noting any signs of damage, tampering or complete destruction; the condition and operation of the well lock; the condition of the protective casing and the cement footing (raised or cracked); and, the presence of water between protective casing and well.
- Take the groundwater level from the collar of the piezometer/monitoring well using an electronic dip meter. The collar level should be taken (if required) during the site visit using a dumpy level and staff.
- Purging and sampling of piezometers/monitoring wells is done on the same site visit when using micro-purge (or other low flow) techniques.
- Layout and organize all equipment associated with groundwater sampling in a location where they will not interfere with the sampling procedure and will not pose a risk of contaminating samples. Equipment generally required includes:
  - Micropore filtration system or Stericup single-use filters (for heavy metals samples);
  - Filter paper for Micropore filtration system; Bucket with volume increments;
  - Sample containers: teflon bottles with 1 ml nitric acid, 75mL glass vials with 1 mL hydrochloric acid, 1 L amber glass bottles;
  - Bucket with volume increments;
  - Flow cell;
  - pH/EC/Eh/T meters;
  - Plastic drums used for transportation of purged water;
  - Esky and ice;
  - Nitrile gloves;
  - Distilled water (for cleaning);
  - Electronic dip meter;
  - Low flow pump pack and associated tubing; and
  - Groundwater sampling forms.

- If single-use stericup filtration is not used, clean the Micropore filtration system thoroughly with distilled water prior to use and between each sample. Filter paper should be changed between samples. 0.45um filter paper should be placed below the glass fibre filter paper in the filtration system.
- Ensure all non-disposable sampling equipment is decontaminated or that new disposable equipment is available prior to any work commencing at a new location. The procedure for decontamination of groundwater equipment is outlined at the end of this section.
- Disposable gloves should be used whenever samples are taken to protect the sampler and to assist in avoidance of contamination.
- Groundwater samples are obtained from the monitoring wells using low flow/micro-purge sampling equipment to reduce the disturbance of the water column and loss of volatiles.
- During pumping to purge the well, the pH, temperature, conductivity, dissolved oxygen, redox potential and groundwater levels are monitored (where possible) using calibrated field instruments to assess the development of steady state conditions. Steady state conditions are generally considered to have been achieved when the difference in the pH measurements was less than 0.2 units and the difference in conductivity was less than 10%.
- All measurements are recorded on specific data sheets.
- Once steady state conditions are considered to have been achieved, groundwater samples are obtained directly from the pump tubing and placed in appropriate glass bottles, BTEX vials or plastic bottles.
- All samples are preserved in accordance with water sampling requirements detailed in the NEPM 2013 and placed in an insulated container with ice. Groundwater samples are preserved by immediate storage in an insulated sample container with ice as outlined in the report text.
- Record the sample on the appropriate log in accordance with AS1726:1993. At the end of each water sampling complete a chain of custody form.

Decontamination Procedures for Groundwater Sampling Equipment

- All equipment associated with the groundwater sampling procedure (other than single-use items) should be decontaminated between every sampling location.
- The following equipment and materials are required for the decontamination procedure:
  - Phosphate free detergent;
  - Potable water;
  - Distilled water; and
  - Plastic Sheets or bulk bags (plastic bags).
- Fill one bucket with clean potable water and phosphate free detergent, and one bucket with distilled water.
- Flush potable water and detergent through pump head. Wash sampling equipment and pump head using brushes in the bucket containing detergent until all materials attached to the equipment are removed.
- Flush pump head with distilled water.
- Change water and detergent solution after each sampling location.
- Rinse sampling equipment in the bucket containing distilled water.
- Place cleaned equipment on clean plastic sheets.
- If all materials are not removed by this procedure that equipment should not be used until it has been thoroughly cleaned

QA/QC DEFINITIONS

The QA/QC terms used in this report are defined below. The definitions are in accordance with US EPA publication SW-846, entitled *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods* (1994[21]) methods and those described in *Environmental Sampling and Analysis, A Practical Guide,* (H. Keith 1991[22]).

Practical Quantitation Limit (PQL), Limit of Reporting (LOR) & Estimated Quantitation Limit (EQL)

These terms all refer to the concentration above which results can be expressed with a minimum 95% confidence level. The laboratory reporting limits are generally set at ten times the standard deviation for the Method Detection limit (MDL) for each specific analyte. For the purposes of this report the LOR, PQL, and EQL are considered to be equivalent.

When assessing laboratory data it should be borne in mind that values at or near the PQL have two important limitations.

"The uncertainty of the measurement value can approach, and even equal, the reported value. Secondly, confirmation of the analytes reported is virtually impossible unless identification uses highly selective methods. These issues diminish when reliably measurable amounts of analytes are present. Accordingly, legal and regulatory actions should be limited to data at or above the reliable detection limit" Keith 1991.

Precision

The degree to which data generated from repeated measurements differ from one another due to random errors. Precision is measured using the standard deviation or Relative Percent Difference (RPD). Acceptable targets for precision in this report will be less than 50% RPD for concentrations greater than ten times the PQL, less than 75% RPD for concentrations between five and ten times the PQL and less than 100% RPD for concentrations that are less than five times the PQL.

Accuracy

Accuracy is a measure of the agreement between an experimental result and the true value of the parameter being measured. The assessment of accuracy for an analysis can be achieved through the analysis of known reference materials or assessed by the analysis of surrogates, field blanks, trip spikes and matrix spikes.

The proximity of an averaged result to the true value, where all random errors have been statistically removed. Accuracy is measured by percent recovery. Acceptable limits for accuracy generally lie between 70% to 130% recoveries. Certain laboratory methods may allow for values that lie outside these limits.

Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is primarily dependent upon the design and implementation of the sampling program. Representativeness of the data is partially ensured by the avoidance of contamination, adherence to sample handing and analysis protocols and use of proper chain-of-custody and documentation procedures.

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[21] US EPA, (1994), *SW-846: Test Methods for Evaluating Solid Waste, Physical/Chemical Methods.* (US EPA SW-846)

[22] Keith., H, (1991), *Environmental Sampling and Analysis, A Practical Guide.*

Completeness

Completeness is a measure of the number of valid measurements in a data set compared to the total number of measurements made and overall performance against DQIs. The following information is assessed for completeness:

- Chain-of-custody forms; Sample receipt form;
- All sample results reported; All blank data reported;
- All laboratory duplicate and RPDs calculated;
- All surrogate spike data reported;
- All matrix spike and lab control spike (LCS) data reported and RPDs calculated;
- Spike recovery acceptable limits reported; and
- NATA stamp on reports.

Comparability

Comparability is the evaluation of the similarity of conditions (eg. sample depth, sample homogeneity) under which separate sets of data are produced. Data comparability checks include a bias assessment that may arise from the following sources:

- Collection and analysis of samples by different personnel; Use of different techniques;
- Collection and analysis by the same personnel using the same methods but at different times; and
- Spatial and temporal changes (due to environmental dynamics).

Blanks

The purpose of laboratory and field blanks is to check for artifacts and interferences that may arise during sampling and analysis.

Matrix Spikes

Samples are spiked with laboratory grade standards to detect interactive effects between the sample matrix and the analytes being measured. Matrix Spikes are reported as a percent recovery and are prepared for 1 in every 20 samples. Sample batches that contain less than 20 samples may be reported with a Matrix Spike from another batch. The percent recovery is calculated using the formula below. Acceptable recovery limits are 70% to 130%.

$$\frac{\text{(Spike Sample Result – Sample Result) x 100}}{\text{Concentration of Spike Added}}$$

Surrogate Spikes

Samples are spiked with a known concentration of compounds that are chemically related to the analyte being investigated but unlikely to be detected in the environment. The purpose of the Surrogate Spikes is to check the accuracy of the analytical technique. Surrogate Spikes are reported as percent recovery.

Duplicates

Laboratory duplicates measure precision, expressed as Relative Percent Difference. Duplicates are prepared from a single field sample and analysed as two separate extraction procedures in the laboratory. The RPD is calculated using the formula where D1 is the sample concentration and D2 is the duplicate sample concentration:

$$\frac{(D1 - D2) \times 100}{\{(D1 + D2)/2\}}$$

Appendix E: Calculation Sheets

	A	B	C	D	E	F	G	H	I	J	K	L
1	UCL Statistics for Uncensored Full Data Sets											
2												
3	User Selected Options											
4	Date/Time of Computation	17/01/2017 11:07:10 AM										
5	From File	WorkSheet.xls										
6	Full Precision	OFF										
7	Confidence Coefficient	95%										
8	Number of Bootstrap Operations	2000										
9												
10												
11	Lead											
12												
13	General Statistics											
14	Total Number of Observations					13		Number of Distinct Observations				11
15								Number of Missing Observations				0
16	Minimum					12		Mean				81.38
17	Maximum					420		Median				18
18	SD					121		Std. Error of Mean				33.57
19	Coefficient of Variation					1.487		Skewness				2.218
20												
21	Normal GOF Test											
22	Shapiro Wilk Test Statistic					0.648		Shapiro Wilk GOF Test				
23	5% Shapiro Wilk Critical Value					0.866		Data Not Normal at 5% Significance Level				
24	Lilliefors Test Statistic					0.345		Lilliefors GOF Test				
25	5% Lilliefors Critical Value					0.246		Data Not Normal at 5% Significance Level				
26	Data Not Normal at 5% Significance Level											
27												
28	Assuming Normal Distribution											
29	95% Normal UCL							95% UCLs (Adjusted for Skewness)				
30	95% Student's-t UCL					141.2		95% Adjusted-CLT UCL (Chen-1995)				158.7
31								95% Modified-t UCL (Johnson-1978)				144.7
32												
33	Gamma GOF Test											
34	A-D Test Statistic					1.34		Anderson-Darling Gamma GOF Test				
35	5% A-D Critical Value					0.77		Data Not Gamma Distributed at 5% Significance Level				
36	K-S Test Statistic					0.292		Kolmogrov-Smirnoff Gamma GOF Test				
37	5% K-S Critical Value					0.246		Data Not Gamma Distributed at 5% Significance Level				
38	Data Not Gamma Distributed at 5% Significance Level											
39												
40	Gamma Statistics											
41	k hat (MLE)					0.75		k star (bias corrected MLE)				0.628
42	Theta hat (MLE)					108.5		Theta star (bias corrected MLE)				129.6
43	nu hat (MLE)					19.5		nu star (bias corrected)				16.33
44	MLE Mean (bias corrected)					81.38		MLE Sd (bias corrected)				102.7
45								Approximate Chi Square Value (0.05)				8.196
46	Adjusted Level of Significance					0.0301		Adjusted Chi Square Value				7.388
47												
48	Assuming Gamma Distribution											
49	95% Approximate Gamma UCL (use when n>=50))					162.2		95% Adjusted Gamma UCL (use when n<50)				179.9
50												
51	Lognormal GOF Test											
52	Shapiro Wilk Test Statistic					0.818		Shapiro Wilk Lognormal GOF Test				
53	5% Shapiro Wilk Critical Value					0.866		Data Not Lognormal at 5% Significance Level				
54	Lilliefors Test Statistic					0.257		Lilliefors Lognormal GOF Test				
55	5% Lilliefors Critical Value					0.246		Data Not Lognormal at 5% Significance Level				
56	Data Not Lognormal at 5% Significance Level											
57												

	A	B	C	D	E	F	G	H	I	J	K	L
58	Lognormal Statistics											
59	Minimum of Logged Data					2.485	Mean of logged Data					3.601
60	Maximum of Logged Data					6.04	SD of logged Data					1.228
61												
62	Assuming Lognormal Distribution											
63	95% H-UCL					246.9	90% Chebyshev (MVUE) UCL					151
64	95% Chebyshev (MVUE) UCL					187.2	97.5% Chebyshev (MVUE) UCL					237.4
65	99% Chebyshev (MVUE) UCL					335.9						
66												
67	Nonparametric Distribution Free UCL Statistics											
68	Data do not follow a Discernible Distribution (0.05)											
69												
70	Nonparametric Distribution Free UCLs											
71	95% CLT UCL					136.6	95% Jackknife UCL					141.2
72	95% Standard Bootstrap UCL					133.6	95% Bootstrap-t UCL					217.6
73	95% Hall's Bootstrap UCL					346.4	95% Percentile Bootstrap UCL					143.5
74	95% BCA Bootstrap UCL					158.1						
75	90% Chebyshev(Mean, Sd) UCL					182.1	95% Chebyshev(Mean, Sd) UCL					227.7
76	97.5% Chebyshev(Mean, Sd) UCL					291	99% Chebyshev(Mean, Sd) UCL					415.4
77												
78	Suggested UCL to Use											
79	95% Chebyshev (Mean, Sd) UCL					227.7						
80												
81	Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.											
82	These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)											
83	and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.											
84	For additional insight the user may want to consult a statistician.											
85												